

RABIES IN BYZANTINE MEDICINE

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Rabies, a terrible disease which has a uniformly fatal result if not prevented by vaccination, is a drama with three actors: the rabies virus, the biting mammal (dog, cat, wolf, fox, bat, etc.) and man. Known for at least 4,000 years in the Middle East, the disease spread into Asia and Europe.¹ Rabies was present in Greece in Homer's time (c. 800 B.C.),² and Xenophon's in the early fourth century B.C., and it is well described by Aristotle in the *Historia animalium*, as well as by various other Greek writers.

One of the few detailed French works on the history of rabies in ancient times is the medical thesis of M. de Tornéry,³ of which the first fifty pages are devoted to classical antiquity and Byzantium. Although composed in the elaborate style typical of the end of the nineteenth century, de Tornéry set out some important conclusions:

1. Although absent from the Hippocratic corpus, rabies was known by the ancient Greek authors, medical and non-medical.

2. The most important source for the history of rabies in antiquity is Caelius Aurelianus (fifth century), who devotes eight chapters to this disease in his *Acute Diseases*.

3. The disease was well examined and studied by several physicians who lived in Ptolemaic Alexan-

dria, including Andreas of Carystos, Demetrios of Apamea, Artemidoros, and Gaïos (a pupil of Herophilos).

4. Rabies is also considered by physicians of the Methodist sect, with early individuals listed as Artorios, Themison (who was probably afflicted with rabies), and his student, Eudemos; Soranos of Ephesos (second century A.D.) is the most prominent member of the sect in Roman times. Other authors also provide descriptions of rabies: Galen, Dioscorides, Rufus of Ephesos, and Poseidonios. Tornéry provides translations of the passages on rabies from Aristotle, Celsus, Galen, Oribasios, Dioscorides, Caelius Aurelianus, Aetios of Amida, and Paulos of Aegina; some further important Greek sources, however, are omitted by Tornéry. One such author, overlooked by Tornéry, is Philumenos.

PHILUMENOS ON RABIES

Philumenos (prob. fl. c. A.D. 180) is extant in Greek in a short tract on poisonous animals and remedies for their bites and stings. The sole surviving manuscript of this text was edited by Max Wellmann as a fascicle of the *Corpus Medicorum Graecorum*,⁴ and a German translation later followed.⁵ Philumenos considers rabies in the beginning of his *Poisonous Animals*, and this account apparently became very important for later Byzantine writers on the topic, as will be documented below.

Philumenos' first paragraphs deal with the description of the rabid dog: it contracts the disease when it is very hot or very cold; it does not eat or drink, has saliva flowing from its mouth, and appears irritable and aggressive. It does not bark,⁶

¹The very ancient origin of this disease—sometimes challenged—is confirmed by P. B. Adamson, "The Spread of Rabies into Europe and the Probable Origin of This Disease in Antiquity," *Journal of the Royal Asiatic Society of Great Britain and Ireland*, 2 (1977), 140–44.

²B. Lincoln, "Homeric λύσσα: 'Wolfish Rage,'" *Indogermanische Forschungen*, 80 (1975), 98–105.

³M. de Tornéry, *Essai sur l'histoire de la rage avant le XIX^e siècle* (Paris, 1893). On the ancient history of rabies, one may also consult: K. F. H. Marx, "Ueber das Vorkommen und die Beurtheilung der Hundswuth in alter Zeit," *Abhandlungen der Königl. Gesellschaft Wissensch. Göttingen*, 17 (1872), 1–56; E. D. Baumann, "Über die Hundswut im Altertum," *Janus*, 32 (1928), 137–51 and 168–85; S. Winkle, "Die Tollwut im Altertum," *Die gelben Hefte*, 11 (1971), 34–44.

⁴M. Wellmann, ed., *Philumeni De venenatis animalibus eorumque remediis* (Leipzig, 1908 [CMG X 1, 1]).

⁵R. Froehner, "Philumenos über die Tollwut," *Archiv für Wissensch. u. prakt. Tierheilkunde*, 54 (1926), 512–18.

⁶This would suggest mute rabies (*rage mue*), a paralytic form of the disease in the dog.

and attacks both men and animals that chance to be in its path, whether they are familiar or not. Philumenos then describes the injuries caused to man by the bite of a dog that is rabid: the symptom called hydrophobia (characterized by spasms), and other disorders that affect the mind, followed by prostration, facial inflammation, and sweating. Sometimes there are also photophobia and anxiety. Some of the persons afflicted "bark like dogs" and attack other people, whom they bite, bringing to them the same illness. Except for one or two cases, Philumenos does not know of any cures for persons afflicted with rabies, and he quotes Eudemos,⁷ a physician of the Methodist sect who lived in the first century A.D., and Themison,⁸ a pupil of Asclepiades of Bithynia.⁹ It may be possible that Eudemos and Themison suffered from rabies, but somehow they survived.

Philumenos next turns to the description of remedies for rabies. First mentioned is a mixture of powdered river crabs (probably crayfish, *Astacus fluviatilis*) calcinated over a fire made from vineyard branches combined with powdered gentian, all diluted in old wine. The patient was to drink this drug for forty days.¹⁰ Philumenos says that the wounds which are deep and wide are less dangerous than simple scratches, since the major gashes allow the blood to flow out abundantly, carrying the "venom" of the disease; this is not characteristic of shallow wounds resulting from bites.¹¹ He therefore suggests that the wound be widened so that the "venom" (*ios*) could escape with the blood.

Philumenos also advises the physician to cauterize the wound, since fire has properties that would destroy the "venom" and could prevent its penetration into the body. Additionally, the wound has to be kept open for forty days, and this is promoted by the application to the wound of a plaster made of brine, crushed garlic, onion bulbs, and swollen grains of wheat (made moist by either soaking or chewing them). If the wound closes before the fortieth day, it should be reopened and recauterized.¹²

Chapter 4 of Philumenos' *Poisonous Animals* describes the diet which must be followed by patients afflicted by rabies.¹³ The diet had to act against the "venom" and weaken its action. One should drink pure wine and sweet milk and eat garlic, onion, and leek. Suggested also are the multi-ingredient theriacs, the "Eupator" or "Mithridation."¹⁴ The disease can be latent generally for forty days, but this stage can last much longer, from six months to as much as one year, or even seven years. If widening and cauterization of the bite have not been performed on the wound during the first days after it occurred, one then had to try to expel the poison by other means, including use of the "medicinal gourd" (*kolokynthē hiera*)¹⁵ and sour milk. Inducing sweats before and after meals is also suggested, as well as the application of a depilatory ointment and strong plasters over the entire body. The most effective preventive remedy, however, is hellebore "to be used boldly, not only once or twice, but many times before and after the fortieth day."¹⁶ Philumenos adds that "the remedy is so strong that it has cured rabid patients who had taken it at the very beginning of the course of the disease." Among the drug recipes that follow are pharmaceuticals mainly of animal origin, many of the so-called "Dreck-Apothek," including the curdled milk of a hare, dessicated dung of a dog, calves' fat, and the like. Philumenos writes that he is quoting these prescriptions from the writings of Theodoros the Physician,¹⁷ who himself is quoting from Krates (otherwise unknown), who has written that the

⁷Eudemos is cited by Caelius Aurelianus, *Acute Diseases* III, 12.107; 15.125; and 16.134 (ed. Drabkin, pp. 368, 378, and 386) for his works and observations on hydrophobia and its treatment. Galen names a Eudemos among the Methodists in *Method of Medicine* I, 7 (ed. Kühn, X, 53), and he is probably the same person who appears prominently in accounts of the plot of Sejanus and Livilla to poison Drusus, son of Tiberius, in A.D. 23 (Pliny, *Natural History* XXIX, 20; Tacitus, *Annals* IV, 3 and 11).

⁸Themison traditionally is cited as the "founder" of the Methodist sect of physicians, and with the redating of the *floruit* of Asclepiades of Bithynia (n. 9 below), we can assume that Themison lived in the late second century B.C., since he was a student of Asclepiades (Pliny, *Natural History* XXIX, 6). Caelius Aurelianus, *Acute Diseases* III, 16.132 (ed. Drabkin, p. 384) and Philumenos, *Poisonous Animals* 1.4 (ed. Wellmann, p. 5) report that Themison contracted rabies but survived.

⁹Until recently, Asclepiades of Bithynia was dated as practicing medicine in Rome c. 90–70 B.C., but a close reading of the primary sources has shown that Asclepiades was dead by 90 B.C. Thus he must be redated at least fifty years earlier. See Elizabeth Rawson, "The Life and Death of Asclepiades of Bithynia," *CQ*, n.s. 32 (1982), 358–70. For references on Asclepiades, see Scarborough and Nutton, "Preface," 206–8.

¹⁰Philumenos 2.2–3 (ed. Wellmann, p. 5).

¹¹Philumenos 2.6 (ed. Wellmann, p. 6).

¹²Philumenos 3 (ed. Wellmann, pp. 6–7).

¹³Philumenos 4 (ed. Wellmann, pp. 7–9).

¹⁴Philumenos 4.4 (ed. Wellmann, p. 7).

¹⁵Probably *Citrullus colocynthis* (L.) Schrader. Cf. Paul V, 3 (ed. Heiberg, II, p. 10), and C. E. Trease and W. C. Evans, *Pharmacognosy*, 11th ed. (London, 1978), 472.

¹⁶Philumenos, 4.10–11 (ed. Wellmann, p. 8).

¹⁷Theodoros was perhaps one of the first-century physicians of the Pneumatic sect. Pliny, *Natural History* XX, 40 and XXIV, 120. Diogenes Laertius II, 8.104. M. Wellmann, *Die Pneumatische Schule bis auf Archigenes* (Berlin, 1895), 13.

poison would be found in the urine of persons bitten by the animal.

The fifth chapter of Philumenos' *Poisonous Animals* considers the problems of persons bitten by rabid dogs or by rabid human beings.¹⁸ Here are quoted recipes for drugs borrowed from Archigenes¹⁹ and Straton (a pupil of Erasistratos):²⁰ one is to use ointments on the wound made from oil and the root of the fenugreek, ground in honey, or apply plasters that contain myrrh, terebinth-resin and copper sulfate mixed with honey, or calcined calves' bones mixed with soft pitch and honey. The most efficient plaster is made up of ground garlic or salt ground up in honey, and the "Dreck-Apothek" reappears with dried pig dung mixed with oil and leek. In addition to other recipes, two final prescriptions are given: fill up the wound with fire-dried dill, or lay on cabbage leaves, verdigris, rue, and salt.²¹

Quite probably derivative from Philumenos is the account of rabies found in the *Poisonous Animals* by a Pseudo-Dioscorides.²² It is uncertain when this tract (along with another Pseudo-Dioscorides' *Poisons*) was added to the manuscript traditions of Dioscorides' *Materia Medica* and *Simples*,²³ but Photios knew these works as part of the collection of tracts written by Dioscorides.²⁴ Meyer speculated that Dioscorides' *Materia Medica* was combined with the *Poisons* and *Poisonous Animals* sometime in the seventh or eighth centuries,²⁵ an opinion shared by Berendes, who translated the two pseudo-Dioscoridean books into German.²⁶ It is, however,

our opinion that these two books are much earlier, even though Oribasios appears to know Dioscorides' *Simples* but not the Pseudo-Dioscorides' *Poisonous Animals* and *Poisons*.²⁷ In chapters 1–3 of Pseudo-Dioscorides' *Poisonous Animals* occurs a description of rabies that is almost identical with that given by Philumenos.²⁸ Chapter 1 outlines the characteristic features of the rabid dog and the hydrophobic patient; chapters 2 and 3 list the remedies for persons bitten by a rabid dog and the various procedures employed to cure the wound (cauterization, scarification, application of plasters) and to expel the "venom." We make note, however, that the "Dreck-Apothek" present in Philumenos is absent in Pseudo-Dioscorides, and the anonymous author insists on the efficacy of the "medical gourd" and hellebore.²⁹

ORIBASIOS ON RABIES

Oribasios, physician to Julian the Apostate (emperor 361–363), mentions rabies in several of his works.³⁰ In his *Synopsis*,³¹ Oribasios gives a good description of the behavior of mad dogs, which lose both their voice and "understanding," not recognizing familiar persons. They do not want to eat and are thirsty; they pant and leave their ears hanging; much foamy saliva comes out of their mouths. When a person has been bitten by a rabid dog, the wound has to be cauterized and left open, then washed with an infusion of camomile or root of the wild patience-dock; the patient should also drink the juice of small buckthorn or *silphion*; *sil-*

¹⁸ Philumenos 5 (ed. Wellmann, pp. 9–10).

¹⁹ Archigenes was a physician of the Pneumatic sect (Pseudo-Galen, *Introduction* 9 [ed. Kühn, XIV, 699]), who probably flourished in the reigns of Nerva and Trajan, A.D. 96–117. Archigenes wrote tracts *On Fevers*, *On Pulses*, and some others (Wellmann, *Pneumatische Schule* [n. 17 above], 19–22, 84–85, and 170–71). Cf. Aetios XIII, 1 (ed. Zervos, pp. 264–65).

²⁰ Straton flourished in the third century B.C. as a younger contemporary of Erasistratos. See Galen, *On Bloodletting, against Erasistratos*, 2 (ed. Kühn, XI, 151 and 197). M. Michler, *Die alexandrinischen Chirurgen* (Wiesbaden, 1968), 95 with references.

²¹ Philumenos 5.8 (ed. Wellmann, p. 10).

²² J. Riddle, "Dioscorides" in *Catalogus*, IV, esp. 118–19.

²³ M. Wellmann accepted Dioscorides' *Simples* as "genuine," and prepared the edited Greek text which appears in Vol. III of his edition of Dioscorides (Berlin, 1914) as *Dioscuridis Liber de simplicibus* (pp. 149–326 [two books with a Greek *pinax*]). Arguments for Dioscorides as the author of *Simples* are given by M. Wellmann, *Die Schrift des Dioskurides Περὶ ἀπλῶν φαρμάκων* (Berlin, 1914).

²⁴ Photius, Cod. 178 (ed. Henry, Vol. II, p. 182).

²⁵ Meyer, *Botanik*, II, 110.

²⁶ J. Berendes, "I. Des Pedanios Dioskurides Schrift über die Gifte und Gegengifte. II. Des Pedanios Dioskurides Schrift über die giftigen Tiere und den tollen Hund," *Apotheker Zeitung*, 92–93 (1905), 908–10, 926–28, 933–35, and 945–54.

²⁷ Oribasios, *Medical Collection*, ed. Raeder, IV, p. 314 (index references to Dioscorides' *Simples*).

²⁸ C. Sprengel, ed., [Pedanii Dioscoridis] *De iis, quae virus eiaculantur, animalibus libellus, in quo et de rabioso cane in Pedanii Dioscoridis Anazarbei*, Vol. II (Leipzig, 1830 [C. G. Kühn, ed., *Medicorum Graecorum opera quae exstant*, Vol. XXVI]), pp. 42–91 (chs. 1–3: pp. 57–66).

²⁹ One may also mention the short paragraph on rabies by Theodorus Priscianus, physician to the emperor Gratian (A.D. 375–383). Priscianus composed the *Euporiston* as a guide to simples and diseases, and in Book, II, 8.26, one reads: "Some would declare that hydrophobias are caused by the bite of a rabid dog, others would say from the bite of a snake. But for us it is superfluous to seek out with an anxious care these causes. It is useless, in fact, for those afflicted by this disease to know its cause." A list of prominent symptoms follows, in turn followed by suggested pharmaceuticals, including powdered gentian root, which will be met in a number of Greek works on the topic. V. Rose, ed., *Theodori Prisciani Euporiston* (Leipzig, 1894), pp. 125–26.

³⁰ Generally we have used the edition of Oribasios edited and translated by Bussemaker and Daremberg (Paris, 1851–1876; 6 vols.).

³¹ VIII, 13: Bussemaker and Daremberg, Vol. V, pp. 417–19 = Raeder, ed., *Synopsis*, pp. 250–51.

phion juice itself can be put into the wound, and the patient is advised that he can drink infusions of germander, gentian root, *polion*, and freshwater crabs (crayfish) with dill. Purgation is promoted by the use of a colocynth, and a piece of it (the size of a bean) is to be taken daily. One is supposed to take the bean-sized piece of the small gourd in a decoction of sage, or of the lodestone of Heracles, called *alysso*, as an especially effective remedy against rabies. One can also take the drug made from the snake called the *echidna*, as well as various diuretics. One must also eat the liver of the dog that bit the victim, but this should not be done alone; one should take all the remedies together. Oribasios concludes his account on "Bites from Rabid Dogs" with the statement that Apollonios of Pergamon had reported that no hydrophobic patient had ever recovered when the disease resulted from the bite of a mad dog, but hydrophobia from other causes could be cured.

In his *Easily Procured Drugs Addressed to Eunapios*,³² Oribasios gives a recipe for treatment of the bite of a rabid dog, in which he advises the roasting of freshwater crabs (crayfish), making them into a fine ash. Medical astrology adds its context here, since one is to prepare the crab-ash after the rising of Canis Major (the stellar constellation), when the sun is in the constellation of Leo and when the moon is in its eighteenth day. A compound drug is prepared which is made up of crab-ashes (ten parts), gentian root (five parts), and frankincense (one part). A large spoonful of this drug is to be put into water and drunk for forty days; if the treatment begins only a few days after the rabid dog bit the patient, two spoonfuls should be taken each day. A formula follows for making a salve which could be applied to the wound: Bruttian pitch (one Roman pound), strong vinegar (one *xestes* [c. one pint]), and opopanax (three Roman ounces).³³ Persons who use this drug are always safe after the bite of a mad dog. Oribasios concludes this terse consideration of treatment of the bites of rabid animals with additional suggestions of herbs used against the bites of poisonous animals (borrowed from Galen's *Mixtures and Properties of Simples*):³⁴ dried catmint (*kalaminthē*: *Napeta cataria* L.), betony (*kestros* = *bettonikē*: *Stachys officinalis* [L.] Trev.), the seeds of wild

rue, rennet from a young rabbit, and beet juice are all recommended. Another summary of treatments for the bites of rabid dogs occurs in Oribasios' *Medical Collection: Selection of Drugs*.³⁵ Here he repeats many of the drugs and herbs he has summarized in other texts (for example, pitch, vinegar, opopanax, freshwater crabs), but of special interest are several remedies made from animals, including the seahorse (*hippocampus*: 117.7 [Raeder, IV, p. 292 = Bussemaker and Daremberg, IV, p. 624]). In many instances, Oribasios' collection of descriptions and remedies for rabies becomes an important source for later Byzantine authors on the subject.

RABIES IN BYZANTINE VETERINARY MEDICINE

The main Byzantine veterinary materials are represented by the corpus of the *Hippiatrica*, which deals chiefly with horse medicine, but the date of the compilation is very uncertain.³⁶ Among the numerous extracts in the collection several authors are quoted by name, and rabies is mentioned frequently enough to suggest a knowledge and concern about the disease among domestic animals.

Apsyrtos was perhaps a veterinarian in the army of Constantine the Great (324–337), and he mentions rabies in horses. He believes that the main cause of the disease is the increase of heat, as well as the horses eating too much vetch. Apsyrtos suggests that cures can be effected with a number of remedies, including the root of the wild cucumber cooked in wine or black hellebore boiled in vinegar.³⁷

Hierocles also mentions rabies in horses, but he has copied from Apsyrtos.³⁸ To Hierocles, the causes of the disease would be due to a large flow of blood into the meninges, the occurrence of bile in the blood, or the bad quality of the water. He says that the horse neighs without warning and will attack men. He advises the same remedies as Apsyrtos, adding crushed rue with mint, and bloodletting

³² III, 72: Bussemaker and Daremberg, Vol. V, pp. 682–83 = Raeder, ed., *Libri ad Eunapium*, p. 432.

³³ The resin of *Opopanax chironium* (L.) Koch.

³⁴ *Simples* VII, 10.1 and 23 (ed. Kühn, XII, 4–5, and 23–24 and *passim*).

³⁵ 117 [118]: Bussemaker and Daremberg, Vol. IV, pp. 623–24 = Raeder, ed., Vol. IV, pp. 291–92.

³⁶ A.-M. Doyen, "Les Textes d'Hippiatrie grecque. Bilan et perspectives," *AntCl*, 50 (1981), 258–73. Cf. also by the same author, "The Hippiatrica and Byzantine Veterinary Medicine" in this collection. More particularly on rabies, cf. L. Moulé, "Histoire de la médecine vétérinaire," *Bulletin Société centr. Médecine vétérinaire*, 45 (1891), 285–86 [horses], 344 [bovines], 435–37 [dogs].

³⁷ *CHG*, I, 347.

³⁸ *CHG*, I, 347; II, 263.

performed on the throat. A drastic treatment included is the cutting of the horse's testicles.

Eumelos gives a good description of the rabid horse:³⁹ it breaks its rack, bites itself, and attacks men. It moves its ears, has staring and glowing eyes, and foam on the mouth. Eumelos advises that one should tie the horse up and draw blood from the leg or the cervical area, and then to rub its body with its own blood mixed with wine, as well as to cauterize its belly and temples. He also suggests castration. After the animal has become quiet, one should inject into the nostrils hemlock seeds crushed in water. Its belly should be released and its head rubbed with vinegar in which black hellebore has been boiled, then covered with sheepskins. Later on, crushed rue should be rubbed on its head, and the animal kept in a warm place.

Hippocrates⁴⁰ describes the symptoms that occur in a rabid horse:⁴¹ its eyes protrude and are infused with blood, the veins on the body are prominent, and the animal has no appetite and is restless. Bloodletting in the veins of the neck is advised, and then the horse should be left in a dark and quiet place. In the evening, one may give it some water to drink, and this may be repeated the next day. During the first three days, its food and drink must be restricted, but afterwards the horse can be allowed to eat normally.

In the *Hippiatrica*⁴² one also finds a recipe for the treatment of a bite from a rabid dog, which reads as follows: six Roman ounces of goat dung, six Roman ounces of old brine (or old salted fish), six Roman ounces of the berries of the dwarf elder (*Sambucus ebulus* L.), forty walnuts, all ground together. Another recipe for treatment of rabies in bovines combines animal, vegetable, and mineral substances: freshwater crab (crayfish), wild grapes (*agriostaphida*, or stavesacre [*Delphinium staphisagria* L. if *agriostaphida* = *staphis agria*] in Ranunculaceae), ground in vinegar; or Syrian sumac, man orchid (*satyrion*: *Aceras anthropophorum* [L.] Aiton fil.), and rock salt mixed with honey and cooked.⁴³

As an appendix to the *Hippiatrica*, we may mention the tract *On Animals* by Timotheos of Gaza,

who lived in the fifth century.⁴⁴ Chapter 26 is devoted to the dog, and rabies is noted, along with two other diseases affecting this animal (dog-quinsey and podagra), paraphrased from Aristotle.⁴⁵ Timotheos then writes:

They who are bitten by a rabid dog fear water [and] seldom live [that is, survive]. Drinking a pill with the right [side] of a hyena, they escape [death] [or] those who sacrifice a puppy and drink the curdled milk from its stomach with water.⁴⁶

The commentators on Timotheos call attention to the venerated belief in the efficacy against rabies of hyena's meat, particularly from its right side, noted in the first century by Pliny the Elder in the *Natural History*: "[The Magi say] that to eat the flesh [of a hyena] renders harmless the bites of a mad dog, the liver being even more efficacious. . . ."⁴⁷ Timotheos continues: When one shows a mirror to people who have been bitten [by a rabid dog] and they see in it the image of a dog [then] they die, but when [they see the image] of a human being, they live. One recognizes the folkloristic elements in Timotheos' fragments, perhaps to be expected from a student of Horapollo,⁴⁸ author of the pseudo-learned *Hieroglyphica*, a prime example of the curious fusion of Egyptian with Greek learning in fourth- or fifth-century Byzantine Egypt. By contrast, the veterinary writers have inherited a lengthy tradition of meticulous knowledge of domestic animal lore, ultimately derived from many centuries of experience on Roman farms.⁴⁹

CAELIUS AURELIANUS

Although not strictly within the Byzantine medical traditions, one must consider the important analysis and synopsis on rabies by Caelius Aurelianus in the fifth century.⁵⁰ Eight chapters of his *Acute Diseases*⁵¹ are devoted to hydrophobia, and the account is rich in quotations from earlier authori-

³⁹ CHG, I, 349.
⁴⁰ On Hippocrates the veterinarian, see G. Björck, "Griechische Pferdeheilkunde in arabischer Überlieferung," *Monde Orient. Rev. Et. Orient (Uppsala)*, 30 (1936), 1-12. I thank Dr. A.-M. Doyen-Higuet for this reference.

⁴¹ CHG, I, 350.
⁴² CHG, I, 357.
⁴³ CHG, II, 50.

⁴⁴ F. S. Bodenheimer and A. Rabinowitz, *Timotheos of Gaza on Animals* (Leiden, 1949). See also M. Wellmann, "Timotheos von Gaza," *Hermes*, 62 (1927), 179-204.

⁴⁵ Aristotle, *Historia animalium* 604a22. The *podagra* here may perhaps be foot-and-mouth disease.

⁴⁶ *Timotheos* (n. 44 above), p. 33.

⁴⁷ Pliny, *Natural History* XVIII, 104.

⁴⁸ Wellmann, "Timotheos" (n. 44 above), 179 with n. 8.

⁴⁹ For a survey in English, see R. E. Walker, "Roman Veterinary Medicine," appendix in J. M. C. Toynbee, *Animals in Roman Life and Art* (London, 1973), 303-43 and 404-14.

⁵⁰ See the introductory essays in Drabkin, ed. and trans., pp. xi-xviii.

⁵¹ Drabkin, ed. and trans., 361-89.

ties in Greek on the disease, so that Caelius Aurelianus is drawing on many of the same sources as would the later Byzantine medical writers, Aetios of Amida and Paulos of Aegina. Caelius Aurelianus begins with a definition of rabies, which he calls hydrophobia, from its most basic symptom, an excessive fear of water. Next comes a precise etiology:

The antecedent cause of the disease is the bite of a mad dog or, as some say, of other animals that are subject to similar madness, such as the wolf, bear, leopard, horse, and ass, or the bite of a human being who has hydrophobia. . . . In some cases the patient is affected by rabies as a result of being injured by the claws of a rabid animal. And it is related that a woman became ill of hydrophobia when her face was slightly scratched by a small puppy. Again a case of rabies is said to have been caused by a slight scratch of a poultry-cock as it was struggling. And once when a seamstress was preparing to patch a cloak rent by the bites of a rabid animal, she adjusted the threads along the end, using her tongue, and then as she sewed she licked the edges that were being joined, in order to make the passage of the needle easier. It is reported that two days later she was stricken by rabies. Moreover, it is possible for the disease to originate in the body without any visible cause, when a state of stricture, such as that which comes from poison, is produced spontaneously. Now some incur the disease quickly after the bite. Others do so more slowly and are affected only after a year or even longer. But in most cases the disease comes after forty days.⁵²

This etiology of rabies is one of the most important and significant for its time, because it broadens the modes of transmission of the disease in contrast to most other authorities, who limited rabies to the bites of wolves, dogs, and human beings. In addition, Caelius Aurelianus makes the distinction between hydrophobia contracted from the bite of a rabid animal and "spontaneous" hydrophobia.

In *Acute Diseases* III, 11–12 (Drabkin, 364–69), he details the symptoms of rabies in humans, and makes a careful distinction between them and those which arise from other, seemingly similar diseases: mania, phrenitis, and melancholia. Caelius Aurelianus is especially critical of Eudemos, a student of Themison, for his statement that melancholia is the same as hydrophobia.⁵³ *Acute Diseases* III, 15 (Drabkin, 371–75) is a careful discussion of various hypotheses proposed for the exact seat of the disease, and which parts of the body are affected by rabies. A number of authorities are cited, and the

suggested organs and parts are reviewed (nerves, meninges, diaphragm, esophagus, heart, etc.), but Caelius Aurelianus is wise enough not to give his own view. His therapeutics are, however, the weakest part of his contribution (*Acute Diseases* III, 16 [Drabkin, 380–89]), and he knows nothing of cauterization of the wound. Tornéry believes that Caelius Aurelianus' poor therapeutics result from the fact that he belonged to the Methodist sect, for whom therapeutics were only a contemplation of nature's efforts promoting recovery of the patients.⁵⁴

ALEXANDER OF TRALLES, AETIOS OF AMIDA, PAULOS OF AEGINA

In the works of Alexander of Tralles (c. 525–605), one finds no mention of rabies.⁵⁵ Although he mentions in his first book various nervous diseases (epilepsy, paralysis, phrenitis, lethargia, etc.), there is nothing about rabies and its main symptom, hydrophobia. But in the works of Aetios of Amida and Paulos of Aegina, rabies is considered in some detail.

Although bites by human beings and dogs are considered in Book XIII of the *Tetrabiblos* by Aetios of Amida (c. 502–575), there is no mention of rabies.⁵⁶ But the disease is described in *Tetrabiblos* VI, which deals with various afflictions of the head and brain.⁵⁷ Chapter 24 begins with the disease in dogs, influenced by heat and hot weather, and cold and cold weather. Not allowed to drink water, they are seized by a great thirst which is why the "evil" (= damage) of the poison increases in intensity all the more. The symptomatology is as follows: rabid dogs are "speechless," that is, unable to bark and they do not recognize their masters; they are hungry and thirsty but unable to drink; they gasp for breath a great deal, exposing the tongue and leaving the mouth open; and they pour forth saliva that is both foamy and profuse. This is a classical description of what is called "dumb rabies" (*rage muet* or *muette*).

Aetios then describes the disease in humans:

⁵⁴ Tornéry, *Essai* (n. 3 above), 28.

⁵⁵ Employing the French translation of Alexander by F. Brunet (Paris, 1933–37).

⁵⁶ J. Théodoridès, "Sur le 13^e Livre du Traité d'Aétios d'Amida, médecin byzantin du VI^e siècle," *Janus*, 47 (1958), 221–37.

⁵⁷ Aetios VI, ch. 24 in *Medicae Artis Principes post Hippocratum et Galenum, Graeci Latinitate donati* (Paris [Stephanus], 1567), Vol. II, cols. 260–63. I wish to thank Prof. J. Scarborough, who has kindly translated for me into English from the Greek of the Olivieri edition (CMG, VIII, 2) an important part of this chapter.

⁵² *Acute Diseases* III, 9.99–100 (trans. Drabkin, p. 363). Translation is Drabkin's.

⁵³ *Acute Diseases* III, 12.107–8 (Drabkin, p. 368).

Everyone who is careless after having been bitten by a rabid dog . . . will either fear water or other liquids, some for forty days, but others for a longer time. The anxiety (*ekstasis*) is more painful for those who think [they see] water or some other translucent liquid in a mirror: they believe they see their own flushed faces with a keen look, full of rage. And this is the power over them, as some say, since the reflected image is that of the biting dog.

Then Aetios tells the story of a "philosopher" (Themison?) who had been bitten by a mad dog and who, while in his bath, saw its image. Reasoning to himself what was in common between the dog and the bath, he was cured. We have here a curious application of psychosomatics to "cure" an infectious disease! Aetios suggests various drugs and compounds, some of which are similar to those already listed by Galen and Oribasios (pitch, vinegar, opopanax, ashes of freshwater crabs, gentian, etc.). Another compound medicine which includes rock salt, chalk, squill, green rue, rosemary, and hoarhound seeds, will reappear in Paulos of Aegina. Still another compound recipe includes sagapenum gum from the stem of *Ferula persica* Willd., or possibly *F. scowitziana* D.C., still used in Arabic medicine, as well as opium, saffron, lycium (probably *Lycium intricatum* Boiss., which remains in the pharmacopoeia of Arabic North Africa), and fresh walnuts.

Kyphi, which is a compound incense,⁵⁸ is also advised, as well as eating the liver of the biting animal with salt and oil, an echo of the tradition recorded in Pliny. With this introduction into the *materia medica zoologica*, Aetios provides further similar examples: the fish, *hippocampus* (seahorse) has the same action as the biting dog's liver, which promotes the patient to drink, due to its blood, and it can be eaten or applied to the wound, ground up in vinegar (this had been mentioned by Oribasios); the rennet of a kitten; and hairs of bears, seals, and hyenas are burnt and given in a solution to drink to the patient. Aetios then speaks of the "test of the nuts," which is probably borrowed from Rufus of Ephesos.⁵⁹ Crushed walnuts were put on the wound suspected of being made by a rabid animal, and then the next day, the walnuts were given to a chicken; if the bird ate them and did not die, it meant that the biting animal was not rabid and thus the wound

was "safe." This curious means of diagnostics will be given again by Paulos of Aegina, John Actuarius, as well as by Rhazes, Avicenna, Albucasis, and Maimonides. Once the scar of the wound is formed, Aetios advises the use of white hellebore (*Veratrum album* L.) in order to prevent any further accident.⁶⁰ It appears that although Aetios has borrowed much from Rufus, Galen, Philumenos, and Oribasios, he provides a greater detail regarding rabies than his predecessors.

On rabies, Paulos of Aegina (fl. c. 640) differs little from Aetios, and the beginning sections of Paulos' medical encyclopedia account of rabies (Book V, 3) are paraphrases of Philumenos or the pseudo-Dioscoridean *Poisonous Animals*.⁶¹ Paulos adds that among the people bitten, only those suffering from human bites have recovered. In Book V, 3, Paulos summarizes the accounts of Philumenos, Pseudo-Dioscorides, cites Rufus for a contrary opinion (rabies is a kind of melancholia), and quotes from Lycos, Oribasios, and—as apparent from the phraseology—Aetios. Paulos believes rabies is caused by a poison which has invaded the entire organism. He mentions the opinion of some physicians, according to whom the aversion to water would be due to a disordered dryness which brings a transmutation of all the body fluids. He further notes that Rufus thought that this aversion to water would be the result of the melancholy afflicting these patients, much as sufferers from melancholia generally fear one thing or another. Paulos also mentions the visual hallucinations of the patients and reports, as had his predecessors, that only one or two cases were known of persons escaping the disease after they had been bitten, and he insists that these people had been attacked by rabid men and not by animals. The "walnut test" follows, taken from Oribasios (so says Paulos), but which is almost identical with the similar passages in Aetios, who probably had also borrowed this diagnostic technique from Oribasios.⁶² Paulos' pharmaceuticals for rabies are almost identical to those of his predecessors.⁶³ One prescription is, however, somewhat modified from the original: a mixture of gentian roots ground up in old wine given with two spoonfuls of partridge blood.

⁵⁸ For this compound incense, see the appendix to J. Scarborough, "Early Byzantine Pharmacology," pp. 229–32, below.

⁵⁹ Daremberg and Ruelle, eds., *Rufus*, pp. 371–75, consider the passage dealing with the "test of the nuts" as borrowed from Rufus, but in the apparatus criticus to the Greek text on p. 372, Ruelle expresses some doubt about this attribution.

⁶⁰ Aetios VI, 24 (ed. Olivieri [CMG VIII 2], pp. 166–67.

⁶¹ Paul (ed. Heiberg), II, 7–8 = Paul (trans. Adams), II, 162–63.

⁶² Paul (ed. Heiberg), II, 9 = Paul (trans. Adams), II, 163–64.

⁶³ Paul (ed. Heiberg), II, 9–10 = Paul (trans. Adams), II, 164–65.

PSEUDO-RABIES IN AGATHIAS

Agathias (c. 537–c. 582) is the author of the important *Histories* which gives details of events in the sixth century.⁶⁴ In the *Histories* (II, 3.4–8), occurs a description of a strange disease which afflicted Leutharis, a leader of the “Barbarians” (Franks and Alamans) and his men, who were fighting the Romans, led by their general Narses. The peculiar events described in this passage took place in Venetia at the beginning of the year 553. The disease was an epidemic, characterized by the following symptoms: (1) agitation followed by falling, backward or forward; (2) foam coming out of the mouth; (3) staring eyes and rolling movement of the eyeballs; (4) the victims bit their own arms, tearing the flesh open and licking the blood; (5) fever and headaches; (6) paralysis and madness; and (7) death. Von Hagen presumed that this outbreak in Leutharis’ army was rabies,⁶⁵ arguing for this diagnosis on the basis of the symptoms with the supposition that the disease would have been transmitted to Leutharis and his men by stray dogs.

In a recent paper considering this case,⁶⁶ I have concluded that the disease was an epidemic, since many persons became ill, and that it affected the nervous system. Although Agathias’ description reminds one of ergotism, frequent in Europe in the Middle Ages, it lacks the digestive symptoms of ergotism, and ergotism lacks the fever which is present in the symptoms displayed by Leutharis and his army. I have, furthermore, discarded rabies, for the following reasons: (1) the occurrence of dogs is not mentioned by Agathias, who was writing at a time when rabies and its transmission to man by dogs was well known; (2) Agathias makes no allusion to hydrophobia, photophobia, and aerophobia, all characteristic of human rabies; and (3) in human rabies, no case history includes the patient biting his own upper limbs and tearing off the flesh. This last symptom is, however, typical of another disease of animals, which resembles rabies—Aujeszky’s Disease, which was described in 1902 by a Hungarian veterinarian, and called also “Pseudo-Rabies.” Aujeszky’s Disease is caused by a virus of

the herpes group, and affects chiefly dogs, cats, cows and oxen, pigs, sheep, and horses. The main source of infection is the pig. Self-mutilations by dogs afflicted with this disease are frequent, and the animal dies after eighteen to thirty-six hours from bulbar paralysis. One is thus tempted to believe the disease described by Agathias is Pseudo-Rabies, or Aujeszky’s Disease. The major difficulty with this diagnosis is that in the few cases of this illness known in humans, the symptoms were very mild and the patients recovered fully.

Two hypotheses seem reasonable: (1) there may have been, in the sixth century, a viral disease related to Pseudo-Rabies (Aujeszky’s Disease), pathogenic for man as well as for animals, which has since disappeared; and (2) the strains of the virus of Aujeszky’s Disease could have been, in Agathias’ day, much more virulent than currently known, and it would affect humans as well as animals. With either hypothesis one may suppose that Leutharis and his men would have contracted the disease from eating pork, one of the usual parts of the diet of the Alamans. It may be that other Byzantine historical sources will reveal other descriptions of rabies in men and animals, but corollary materials have not emerged in the limited search made at this time.

THE *GEOPONICA* AND RABIES

It is of interest that only a few hints on rabies are to be found in the *Geoponica*, a Byzantine encyclopedia which is of uncertain date,⁶⁷ though the preface seems to indicate dedication to Constantine VII Porphyrogenitos.⁶⁸ Such passages as do occur in this agricultural compilation that are concerned with rabies consider very briefly remedies used against the bite of a mad dog, such as grapevine ashes, and the leaves of garlic and cabbage. One chapter, however, is extracted from Theonnestos, and suggests what should be done for female dogs that are rabid:

One must lock up rabid bitches, and not allow them to eat during the day; then mix some hellebore into their drink. When they have been purged, one ought

⁶⁴R. Keydell, ed., *Agathiae Myrinaei Historiarum* (Berlin, 1967 [CFHB, Vol. II]), and J. D. Frendo, trans., *Agathias: The Histories* (Berlin, 1975, [CFHB, Vol. II A]). *Histories* II, 3.4–8 = Keydell, pp. 43–44 = Frendo, pp. 34–35.

⁶⁵B. von Hagen, *Lyssa, eine medizinischgeschichtliche Interpretation* (Jena, 1940).

⁶⁶J. Théodoridès, “Quelle était la maladie décrite par l’historien Agathias (VI^e siècle A.D.)?”, *Histoire des sciences médicales*, 15 (1981), 153–58.

⁶⁷The only available edition of the Greek text of the *Geoponica* is that of H. Beckh (Leipzig, 1895). For the date of the collection, see E. Oder, “Beiträge zur Geschichte der Landwirtschaft bei den Griechen,” *RhM* n.f. 45 (1890), 58–98, and 212–22, and *ibid.*, 48 (1893), 1–40, and M. Ullmann, in *HO*, VI (1972), 431 f.; see also H. Hunger, *Die hochsprachliche profane Literatur der Byzantiner*, 2 vols. (Munich, 1978), II, p. 273.

⁶⁸*Geoponica*, Prooemium 11 (ed. Beckh, pp. 2–3).

to feed them bread made from barley. Persons bitten by rabid dogs should be treated in the same manner.⁶⁹

RABIES IN LATER BYZANTINE MEDICINE

Rabies is mentioned by four physicians of the late centuries of Byzantium (tenth to the fourteenth centuries): Theophanes Nonnos, Nicholas Myrepsos, Demetrios Pepagomenos, and Joannes Actuarius. Theophanes Nonnos (tenth century) considers the disease in chapter 271 of his *Epitome de curatione morborum*,⁷⁰ devoted to the rabid dog and venomous animals. One finds here an abstract of what has already been said by Philumenos and his later commentators. The test of the nuts is also mentioned. Among the plasters recommended for application to the wound, we find the usual ones with vinegar, opopanax, balsam, garlic, onions, and salt. Another one, composed of grapevine ashes with oil and mint or honey or ashes of the fig tree, is proposed. The wound must be washed with an infusion of camomile or rumex (small sorrel) while some advise its cauterization. The absorption of a mixture of crayfish ash with gentian root in pure wine is also suggested, as well as the use of theriac, colocynth with a decoction of sage or heracleum, and also the liver of the biting dog. There are here very few original data, and in what concerns rabies Nonnos has to be considered a very poor compiler.⁷¹

Nicholas Myrepsos (thirteenth century) is the author of the *Dynameron*, an important treatise on pharmacology, which was used until the seventeenth century in western Europe as a work of reference. Among the numerous recipes and preparations given in the *Dynameron*, there is the following, prescribing a drink to be given to persons afflicted by rabies:

A wonderful potion against human rabies by the grace of God. Take about three ounces of the root of the soft esparto,⁷² and take two ounces from it. After a careful cleaning and washing, have it boiled in six pounds of wine of good quality until a third of the

wine is evaporated. Then have it filtered and take two ounces from it. To each of these portions add half an ounce of theriac and six ounces of Montbazillac wine.⁷³ To take it for twenty days while fasting proves to be a good remedy.⁷⁴

Demetrios Pepagomenos (thirteenth century) is the author of, *inter alia*, a *kynosofion*, devoted to the diseases of dogs.⁷⁵ Rabies is mentioned and information given on its symptoms which is repetitive of earlier Greek and Byzantine texts on the subject. To detect the disease, one should give the dog a mixture of wild rose tree ground into a powder and then mixed with spring water. As a mode of prevention, Pepagomenos advises the removal of the "tongue worm," which looks like a white tendon. We have here a repetition of a belief recorded in the first century by Pliny in the *Natural History*. This operation was called everration, and remained recommended for dogs in Europe until the end of the nineteenth century as a method of preventing rabies. Pepagomenos also suggests some preventive remedies: (1) eating wild cucumber and old grease; (2) boiled ivy taken on the morning of a sunny day; and (3) birds' excrement and donkey's genitalia taken with good, strong, old wine. Pepagomenos also advises that rue leaves be applied to the wound of a dog that has been bitten.

The last Byzantine physician to mention rabies is Joannes Actuarius (fourteenth century) in his *De methodo medendi*. The disease is included in Book VI, chapter 10, along with the poisons,⁷⁶ and the section repeats and summarizes what had already been written on the subject by his predecessors. The only apparently original remark he makes is that the disease is a humoral one, induced by a warming of the bile. He advises the use of a plaster of white *iera* and a *catapotum* (= pill) of the size of an almond, the composition of which is not given.

In conclusion, one may say that the information given on rabies by Byzantine authors, whether physicians, veterinarians, or naturalists, is a repetition of what had been said on this disease in classical or post-classical Greek medicine. It appears that Philumenos' text is the major source for most later writers on rabies. In Greek and Byzantine medical theory, once the notion of a rabid dog passing venom had been proposed, this view would

⁶⁹ *Geoponica* XIX, 3.1 (ed. Beekh, p. 504). Translation by A.-M. Doyen-Higuet, whom I thank here.

⁷⁰ L. Felici, "L'opera medica di Teofane Nonno in manoscritti inediti," *Acta medicae historiae Patavinae*, 28 (1981-1982), 59-74.

⁷¹ Rabies is also mentioned in a pharmacological tract, *De remediis*, ascribed to Nonnos; the first section is devoted to drugs and their use against biting and venomous animals. I thank here Mrs. Felici-Duimovich (Florence) and Dr. J. A. M. Sonderkamp (Berlin) for their useful and priceless assistance and references. On Nonnos, see also Dr. Sonderkamp's "Theophanes Nonnos: Medicine in the Circle of Constantine Porphyrogenitus," in this volume.

⁷² A grass of the genus *Stipa*.

⁷³ A white, sweet wine, produced in the area of Montbazillac near Bergerac (Dordogne, France).

⁷⁴ *Medicae Artis Principes* (n. 57 above), II, col. 774. I thank Dr. T. Vetter (Strasbourg) for the translation.

⁷⁵ The text is included in R. Hercher, ed., *Varia Historica Epistolae Fragmenta* (Leipzig, 1866), 590-91, and 595.

⁷⁶ *Medicae Artis Principes* (n. 57 above), I, col. 330 and sqq.

be held for many centuries. Rabies was thought to be due to a "venom" or poison, and this is why the mad dog is always mentioned in chapters devoted to such venomous or poisonous animals as snakes or scorpions. Given this basic assumption, the chief aim of the Byzantine physicians was to try to prevent the penetration of this venom into the organism. Various procedures were used to do so, the major ones being the cauterization and scarification of the wound given to the patient by the biting animal. In treatment later on in the course of the disease, plasters composed of various substances of a chemical, vegetable, animal, or mineral nature were put on the wound to keep it open, and thereby prevent the penetration of the "venom." At the same time, or later on, the intake of purgative and diuretic remedies was advised, if the "venom" had already reached the organism due to an insufficient cauterization or scarification of the wound.

The main interest of the Byzantine texts on rabies lies on the compilation of the very rich and

diversified polypharmacy, in which medicinal plants occupy the most important place.⁷⁷ Moreover, several of the Byzantine remedies against rabies are mentioned by Islamic authors.⁷⁸

Two words borrowed from the title of an excellent paper on Byzantine medicine⁷⁹ rather well characterize what Byzantine medical authors have said about rabies as well as other subjects: "tradition" and "empiricism."

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⁷⁷See Margaret H. Thomson, *Textes grecs inédits relatifs aux plantes* (Paris, 1955), for a number of these medicinal plants which were used against the bites of supposedly rabid dogs.

⁷⁸J. Théodoridès, "Ibn Sinā et la rage," in *Actas XXVII Congr. intern. Historia Medicina (Barcelona 1980)*, Vol. II (1981), 756–60.

⁷⁹O. Temkin, "Byzantine Medicine: Tradition and Empiricism," *DOP*, 16 (1962), 97–115 = Temkin, *Double Face of Janus*, 202–22.